



# Nook Simple Touch with GlowLight Teardown

We tore down the Nook Simple Touch with GlowLight on May 30, 2012.

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## INTRODUCTION

This is the 21st century; reading lights are old school, right? Heck, light bulbs, in general, are old school. If my electronic device can't light itself, I don't want it! Join us as we shed some light on the newest eReader from the bright minds at Barnes & Noble.

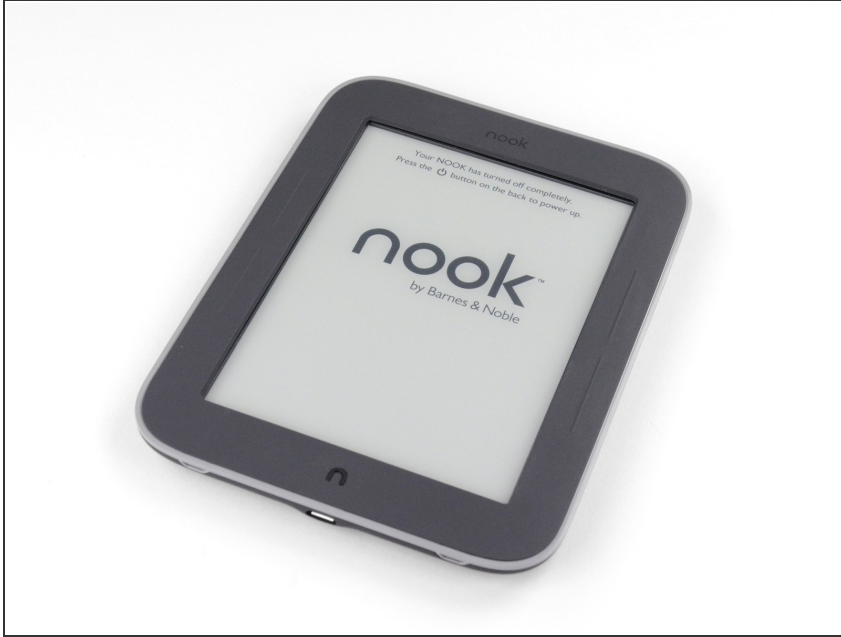
Did this teardown leave you glowing? Follow [@ifixit](#) on Twitter for live updates on the latest products and teardowns.



### TOOLS:

- [Metal Spudger](#) (1)
  - [iFixit Opening Tools](#) (1)
  - [Spudger](#) (1)
  - [T5 Torx Screwdriver](#) (1)
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## Step 1 — Nook Simple Touch with GlowLight Teardown



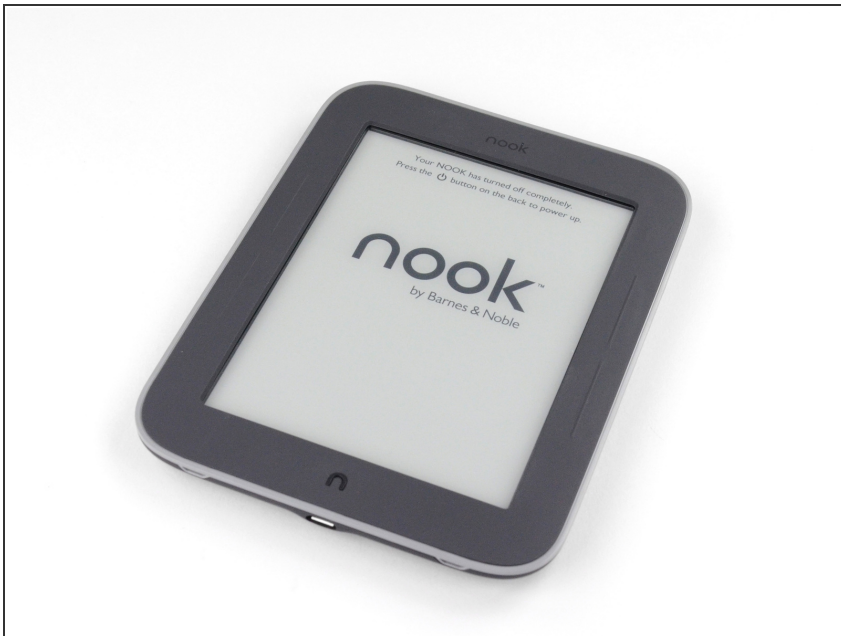
- In an attempt to solve the centuries-old problem of how to read in the dark, Barnes & Noble brings us a revamped version of last year's Nook Simple Touch.
- The specs are identical to last year's model with one main addition:
  - Adjustable GlowLight technology
  - 2 GB internal storage, supports up to 32GB of additional storage via microSD card
  - 16-level grayscale 6 inch E-Ink touchscreen with a max resolution of 600 x 800 pixels
  - 802.11b/g/n Wireless connectivity

## Step 2



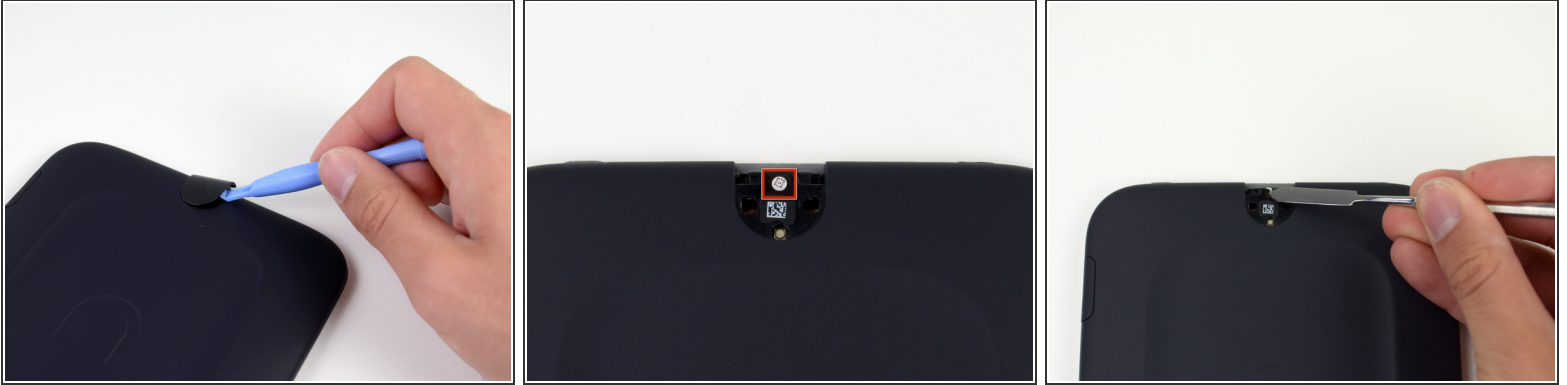
- [Move along; nothing to see here.](#)
- The back and sides of the device contain no surprises.
- The power button is large, but must be pressed in a certain spot to actually click. It also seems rather loosely attached.
- Four indents (two on top, two on bottom) in the front case of the GlowLight look like they may help out with disassembly. Possible points for repairability?

## Step 3



- The front of the device contains the signature "n" button at the bottom and two sets of page up/page down buttons on the sides.
- With the GlowLight backlight turned off, it kind of [looks just like](#) a Nook Simple Touch!
- Okay, we're getting antsy; let's dig in!

## Step 4



- The instability of the power button proves helpful as we easily pop it off with a [plastic opening tool](#).
- The clips on the outside and the ease of prying off the button gave us a warm, fuzzy, repair-friendly feeling. That tamper-proof sticker, however, did not.
- ❗ Below the sticker we see the power button sensor. Its small size and lower location explain the difficulty of pressing the button.
- Oh well...so long warranty! Our [metal spudger](#) takes care of that.

## Step 5



- It appears that only a single T5 Torx screw, which is easily removed with our [54 Bit Driver Kit](#), stands between us and the glowing innards of the newest Nook.
- With the screw out of our way all we have to do is slide the rear panel down to free it.
- Tamper-proof sticker aside, this device is starting to receive some glowing repairability reviews around the office.



## Step 6



- As our [spudger](#) comes out to disconnect the solitary battery connector, we wait for something along the lines of [this](#) to happen.
- Unfortunately, this is all we get. No glowing aura; no chest full of gold; not even a speck of pixie dust. The only explanation is that the GlowLight must have some other form of mythical power behind it.

## Step 7



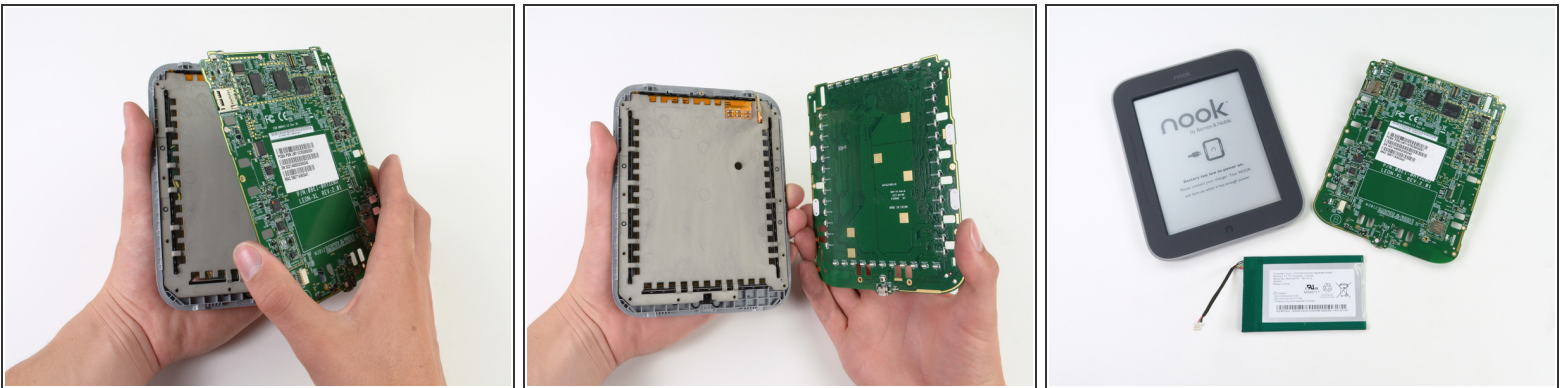
- The only two components attached to the rear panel are the microSD flap and the battery.
- The battery is held in place by some heavy duty tape, but our [metal spudger](#) eventually unsticks it all.
- The battery is rated at 3.7V and 1530 mAh for 5.66 Wh—a solid rating for an e-reader.
- Barnes & Noble claims that the battery provides, at an average of one hour of reading per night, one month of usage per charge with the GlowLight on, or two with it off.

## Step 8



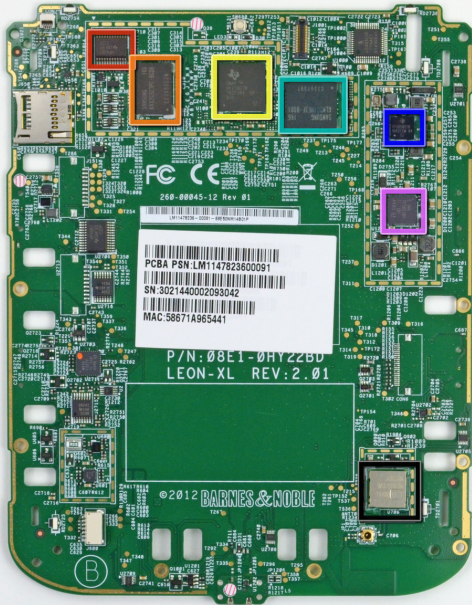
- [In most teardowns](#), this is about the step when we start disconnecting a billion things from the motherboard. This, however, is not most teardowns.
- A mere eleven T5 Torx screws, one ZIF connector, and the display cable connector hold the motherboard in place.

## Step 9



- We remove the motherboard and are amazed as a bright aura of GlowLight magic emits from the innards of the device (aura not pictured).
  - Though the device has proven very simple to take apart, we do note that all of the components are held on with a lot of adhesive. We have not had to use a [heat gun](#) yet, but we tread carefully as we remove the heavily adhered motherboard from the frame.
- ⓘ While devices often [implore us not to dig into them](#), the Nook Simple Touch with GlowLight keeps on smiling, even with its battery and motherboard removed, thanks to its [E Ink technology](#).

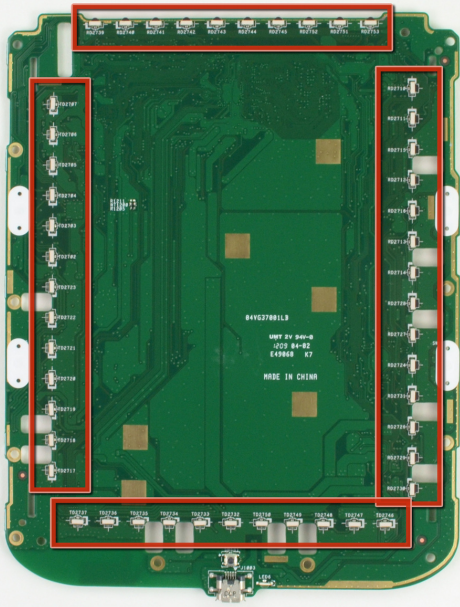
## Step 10



- The prominent chips on the front side of the motherboard include:
  - Texas Instruments [HP4067](#) High Speed CMOS 16 Channel Analog Multiplexer/Demultiplexer
  - Samsung [K4X2G323PC](#) mobile 2Gb (or 256 MB) DRAM
  - Texas Instruments [OMAP 3621 BCYN](#) 800 MHz TI processor
  - Samsung [KLM2G1HE3F](#) NAND flash memory.
  - Texas Instruments [TPS65921B](#) Power Management Circuit for USB and ADC.
  - E-INK TPS65181
  - Jorjin [WG7310-2A](#) Wi-Fi module

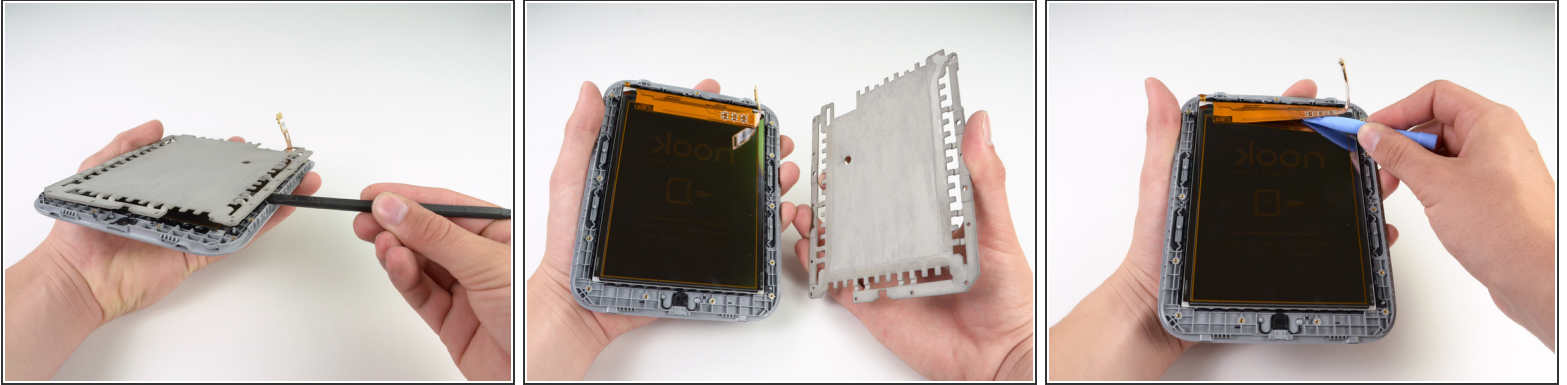


## Step 11



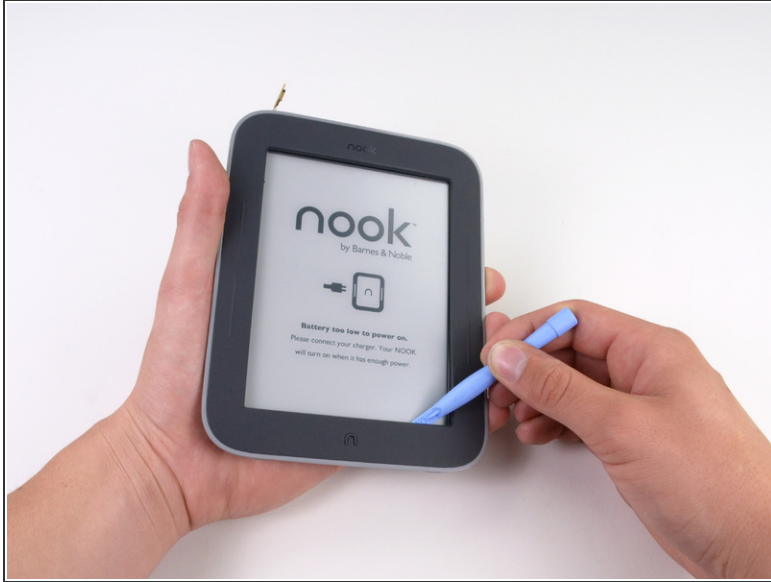
- On the back of the motherboard we found:
  - Empty space...hmmm...
- Closer inspection reveals rows of emitters and receivers that make up the [infrared grid](#) touchscreen.

## Step 12



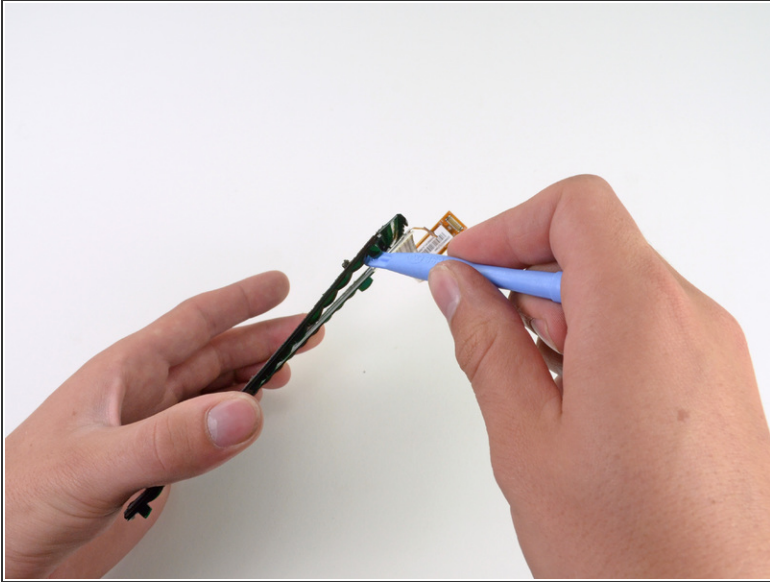
- Time to remove the frame from the display assembly. Any guesses as to how it is secured?
- If you guessed boatloads of adhesive, you were correct!
- With the help of a [spudger](#), we carefully pry the frame from the display assembly, nervously holding our breath at every *creeeeeeek* emitted from the loosening frame.
- The frame is made out of magnesium, as opposed to the aluminum plate found in the non-lit Simple Touch. We verified this magnesium claim the hard way, apparently [not having learned our lesson](#) from [last time](#).
- After removing the frame, we are finally ready to take out the display assembly. We start by, surprisingly, removing more adhesive holding the display cable in place.

## Step 13



- To separate the display assembly from the front case, we slide a [plastic opening tool](#) around its outer perimeter to release yet another full set of tape strips.
- While we understand the timeless idea of [using gobs of tape to keep things together](#), we are beginning to wonder if there is a conspiracy with a tape manufacturer going on here...

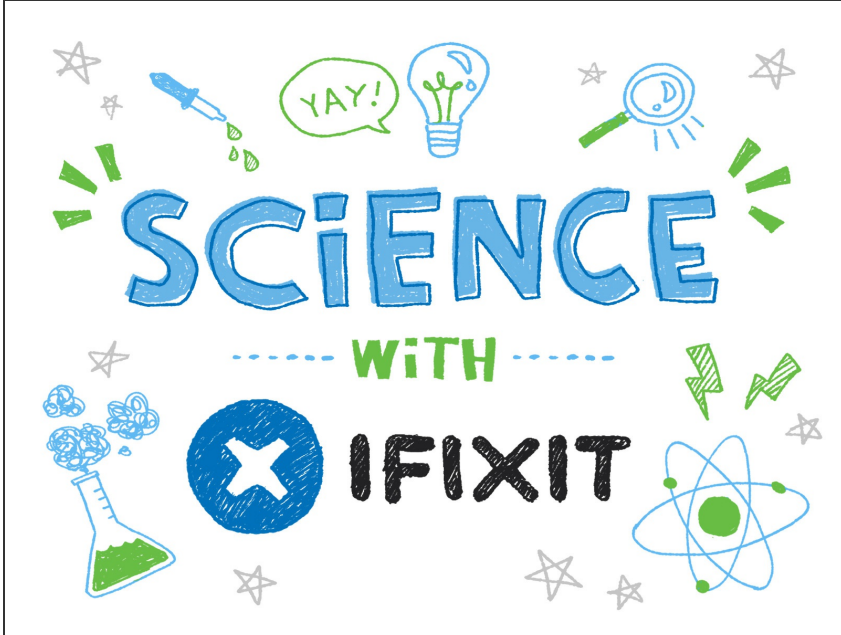
## Step 14



- We pry the plastic display bezel from the display assembly with our [plastic opening tool](#) .
- The bezel is secured by a layer of tape (surprising right?) and seems to be composed out of a green translucent plastic.
- And guess what - we found something interesting inside this device! No, seriously! We'll analyze it...WITH SCIENCE!



## Step 15



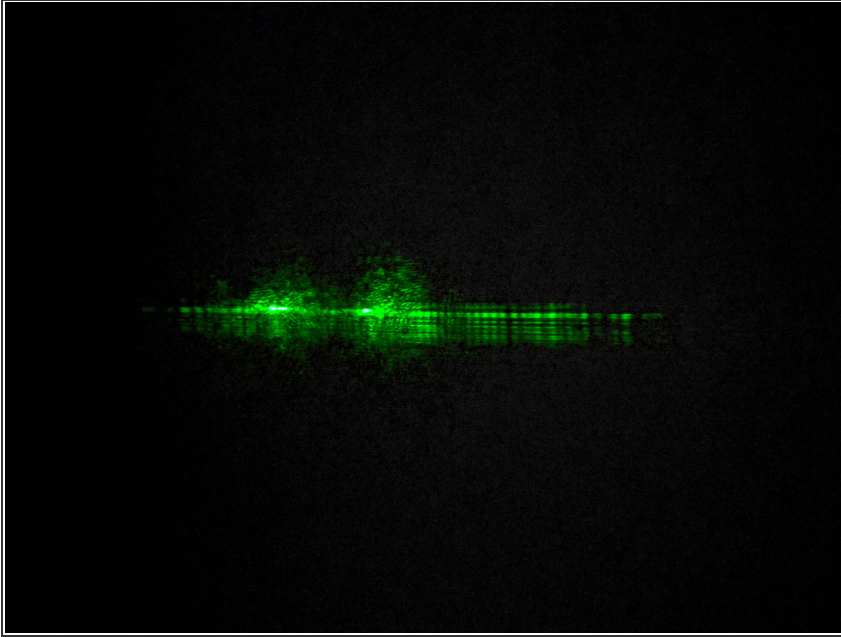
- It's time for another **Science with iFixit!**
- [Fireflies](#) and [glowsticks](#) are one thing, but GlowLight is a different technology. The chief claim of GlowLight is that it evenly distributes the light across the whole screen.
- Although there has been speculation as to how it actually works, the GlowLight has nothing to do with the magnesium frame inside. The interesting technology uses the display assembly itself to achieve the evenly-lit screen.

## Step 16



- The display assembly contains the front glass and array of GlowLight LEDs, all fused together into one component.
- Notice the array of eight LEDs located on top of the display assembly. These LEDs are the only light for the entire screen.
- The glass over the E-ink screen takes the light from the eight LEDs and evenly distributes it across the screen.
  - How, you ask?
- The glass is specially designed using a fundamental principle of optics: [diffraction](#).

## Step 17



- Light coming from the LEDs goes into the glass, which contains a [diffraction grating](#)—an optical component that has slits or grooves as part of its structure. Usually, a diffraction grating is a separate piece of an assembly, but B&N's engineers integrated it into the glass.
- This diffraction grating bends and disperses the light throughout the screen. Barnes & Noble really did their homework on this one, because instead of a simple linear diffraction grating (think of a bunch of parallel slits), it appears that the diffraction grating varies throughout the glass to evenly disperse the light.
- How do we know it's a diffraction grating?
  - [Lasers](#). We took a laser and beamed it through the glass panel onto a wall. Unlike the light of the white LEDs found on the Nook, the green laser beam (which is all the same wavelength), was split into the diffraction pattern shown. If no diffraction grating was present in the screen, the laser beam would be projected as a singular dot on the wall.

## Step 18



- Nook Simple Touch with GlowLight Repairability Score: **7 out of 10** (10 is easiest to repair).
  - The opening procedure was very simple, and aside from the massive amounts of adhesive, every part came free rather easily.
  - There were a total of only 12 screws (all T5 Torx), 11 of which were the same length.
  - The battery can easily be replaced by taking out one screw and one connector.
  - Every single internal component is held down by a lot of tape or glue, which may need to be reapplied upon reassembly.
  - The front glass, GlowLight LEDs, and digitizer are fused together, so breaking any of these parts will require replacement of the entire display assembly.

To reassemble your device, follow these instructions in reverse order.

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